

JAPANESE

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

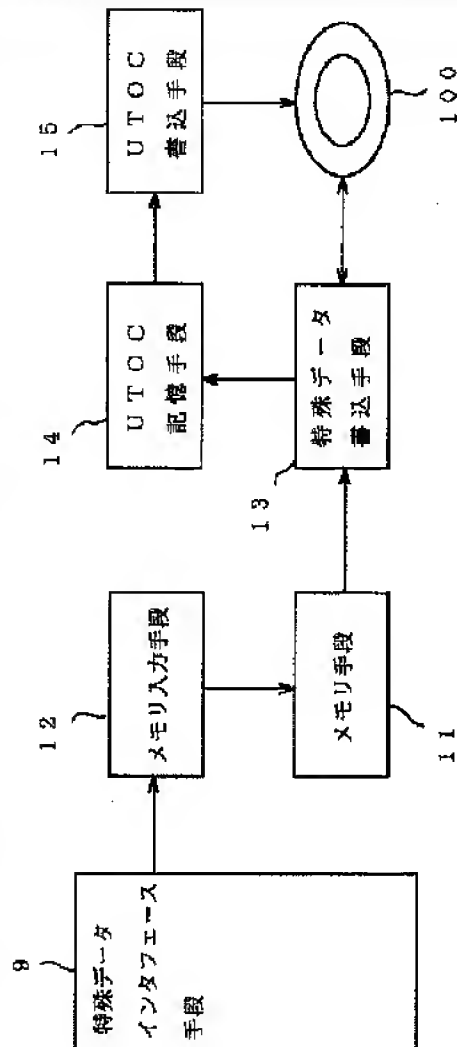
[Field of the Invention]This invention relates to the playback equipment, the recorder, record method, and regeneration method which perform the playback of a recording-medium controlling method and a recording medium and record which manage recording media, such as a mini disc.

[0002]

[Description of the Prior Art]In recent years, in the field of a digital audio, record / the record/playback equipment to reproduce is developed using high efficiency coding in digital audio data. Drawing 1 is a figure showing an example of this kind of record/playback equipment. When

Drawing selection

Representative drawi



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drawing 1 is referred to, in this record/playback equipment. In order to use the mini disc (MD) and to perform record of the digital audio data to the mini disc 100, and playback as the recording medium 100, A/D converter 2 which changes an audio input into digital audio data, D/A converter 3 which changes digital audio data into an analog signal, The ATRAC section (Adaptive Transform Acoustic Coding part) 4, The shockproof memory 5, the shockproof memory controller 6, the EFM encoder / decoder section 7, and the controller part (CPU) 8 that performs the whole control are formed.

[0003]Here, the ATRAC section 4 has the function of an encoder and the function of a decoder by coding (coding) which is a new method of audio compression technology, combines zone division and orthogonal transformation, applies the masking effect on an acoustic sense, and obtains high compression efficiency.

[0004]Namely, when the function of an encoder is used, the ATRAC section 4, Digital audio data are first divided into three zones, next it converts into a sampling time series, and digital audio data are changed into the spectrum coefficient data on a frequency axis by MDCT which is a kind of orthogonal transformation for every zone considering 512 samples (about 11 m seconds) as the longest time.

[0005]Data of one zone when digital audio data are divided into three zones at drawing 2 (a) (digital-audio-data DT (each data is for example, 16 bit expressions) on a time-axis is shown, and) As the ATRAC section 4 divides digital audio data as shown in drawing 2 (a) into the unit block (for example, block containing the data of 512 points) of a certain size and it is shown in drawing 2 (b), MDCT (Modified Discrete Cosine Transform) is given to the digital audio data within a compression unit block by considering this unit block as a compression unit block, Conversion compression is carried out at the spectrum coefficient data (frequency component data) on a frequency axis as shown in drawing 2 (c). The spectrum coefficient data changed in this way makes lower-limit-of-hearing characteristic K_1 and masking effect K_2 based on acoustic-sense analysis reflect in the ATRAC section 4, and the amount of information is compressed further. The information (information compressed for every compression unit block) compressed

in this way is called a sound group, and is edited into a format as shown in drawing 2 (d).

[0006]Thus, it is compressed into the 424 bytes 1/5, i.e., abbreviation, for every sound group by the amount of information of 2048 bytes of two-channel 512 samples before compression, and this sound group, It is eventually recorded on the mini disc 100 via the shockproof memory 5 like the after-mentioned, the shockproof memory controller 6, and the EFM encoder / decoder section 7.

[0007]In drawing 2 (d), audio spectrum data (spectrum data) are each spectrum coefficient data obtained from drawing 2 (c).

Sound parameters are ancillary data, such as a scale factor of each partition-bands region for transmission, and word length (word length).

As shown in drawing 3, word length (word length) is the number of bits which carried out re quantization of the spectrum coefficient.

A scale factor is an approximate value of the maximum spectrum level of the partition-bands region for transmission.

[0008]When the function of the decoder of the ATRAC section 4 is used, the ATRAC section 4, Spectrum coefficient data as shown in drawing 4 (b) from a sound group as shows drawing 4 (a) read from the mini disc 100 contrary to the method of the compression mentioned above is acquired, IMDCT (InverseModified Discrete Cosine Transform) as shown in this spectrum coefficient data at drawing 4 (c) is given, It changes into the data on a time-axis, and to the changed data, block connection and filter composition are performed and it reproduces to digital-audio-data DT as shown in drawing 4 (d).

[0009]the sound by vibration in case the digital audio system which used the mini disc is used for the shockproof memory 5 outdoor -- breaking off in etc. the sound by the mechanical oscillation of the optical pickup on a mini disc breaking off -- -- it is provided as a buffer for preventing. The shockproof memory controller 6 controls buffering of the spectrum coefficient data to the shockproof memory 5. The EFM encoder / decoder section 7 is formed in order to generate the record signal to the mini disc 100. EFM (Eight to Fourteen Moduration) which is a modulation method of a compact disk (CD) is used for this modulation

method as it is.

ACIRC which returned interleave of CIRC (CrossInterleave Reed-SolomonCode) in CD is used for the correction code.

[0010]Next, the recording operation (sound recording operation) of such record/playback equipment of composition and reproduction motion are explained. First, if an audio input inputs into A/D converter 2 via a microphone (not shown) at the time of sound recording operation, in A/D converter 2, an audio input will be changed into digital audio data, and it will give the ATRAC section 4. In the ATRAC section 4, it is made a sound group as does conversion compression of the digital audio data and shows drawing 2 (d) with the encoding function. Thus, the sound group outputted from the ATRAC section 4 is recorded on the mini disc 100 via the shockproof memory controller 6 (shockproof memory 5), and the EFM encoder / decoder section 7 (sound recording).

[0011]At the time of reproduction motion, the data (sound group) currently recorded on the mini disc 100 by the optical pickup (not shown) (sound recording) is read, It gives the ATRAC section 4 via an EFM encoder / decoder section 7, and the shockproof memory controller 6 (shockproof memory 5). In the ATRAC section 4, with the decoding function, extension playback of the data from the mini disc 100 is carried out, and it is made digital audio data. Thus, the digital audio data outputted from the ATRAC section 4 are added to D/A converter 3, and are changed into an analog signal in D/A converter 3, for example, a reproducing output is carried out as an audio output from a loudspeaker (not shown).

[0012]In order to perform edit of the mini disc 100 etc. in such record/playback equipment, The digital audio interface (DAI) 20 provided with the transmission output function to the exterior and the receiving function from the outside is formed further, and the copy (duplicate) of the mini disc 100, etc. can also be made via this digital audio interface 20.

[0013]It seems that by the way, there are two kinds such as MD only for playback (prima star MD) and recordable MD (MD for sound recording: recordable MD) of mini discs (MD) as a recording medium, and recordable MD shows the data structure to drawing 5. Namely, in recordable MD, as a modulating method written in a disk as mentioned above, EFM (eight to fourteen modulation), Although ACIRC is

adopted as an error correcting code, the audio information compressed into this format is gathered for every block, and is recorded and it has become a method very near the "mode 2" standard of CD-ROM, To it having been 13.3 m seconds, if CD-ROM uses 98 frames of CD as one sector and it converts into regeneration time, in recordable MD. For example, the interleave length of CIRC from it being longer than one sector of CD-ROM by 108 frames (14.5 m seconds). in order to record data using the error correcting code of CIRC, before beginning to record data -- the link area (link sector) more than 108 frame (one sector +alpha) -- namely, -- "-- it must throw away and field" must be prepared. Even after finishing recording data, in order to complete the interleave of an error correction, it is necessary to secure the field of 108 or more frames similarly.

[0014]Under the present circumstances, since link areas will be scattered all over here and there [of a disk] and the utilization efficiency of data will worsen if it begins to record data on recordable MD from arbitrary places, It is good to record data for every to some extent big settlement, and for this reason, with a mini disc, as shown in drawing 5, data is gathered and recorded on the record unit called a "cluster." One cluster consists of 36 sectors, and rewriting is certainly performed by the integral multiple of one cluster, and he once stores the data to record in RAM, and is trying to write in a disk. This RAM can be used together with the shockproof memory 5.

[0015]If it puts in another way, in recordable MD in one cluster (=36 sector), When make head 3 sector into a link area (link sector), use the one following sector as sub data, you are trying to record compressed data on the 32 remaining sectors and data is recorded, When beginning to record from the middle of the 2nd link sector of the link sectors which consist of three sectors and finishing writing 36 sector eye, he is trying to write the data for error corrections to the middle of the 1st link sector of the following cluster, and the 2nd link sector.

[0016]Also in MD only for reproduction, although the data structure is the same thing as drawing 5 fundamentally, In MD only for reproduction, three sectors of a link area are unnecessary by writing data by the picture drawn without lifting the brush from the paper, These three sectors can be added, head 4 sector can be assigned to sub data, the data of

GURAFFIKKUSU, etc. can be put into this head 4 sector, and it can use for karaoke etc.

[0017]Thus, the data structure of MD only for reproduction, and recordable MD, Only in whether a link area is provided, it is different, and since the fundamental data structure is the same, To the recording medium (mini disc) 100 of the digital audio system of drawing 1. When any recording medium of MD only for reproduction and recordable MD can be used and recordable MD is used for the recording medium 100, Compress audio information by the ATRAC section 4, and it is recorded on the recording medium 100 as compressed data (ATRAC data), When it can reproduce and uses MD only for reproduction for the recording medium 100, the compressed data (ATRAC data) currently recorded on the recording medium 100 by the ATRAC section 4 can be read.

[0018]In the case of MD only for reproduction (prima star MD), it is managed by TOC, and, in the case of recordable MD (recordable MD), each track information of compressed data (ATRAC data) is managed by user TOC (UTOC).

[0019]For example, in recordable MD, as shown in drawing 6, a lead-in groove field is established in the predetermined field of the inner circumference, and the lead-out field is established in the outermost periphery side. And the field where a user can record predetermined data is provided between this lead-in groove field and a lead-out field, A user TOC (UTOC) field is established in the most-inner-circumference side of this field, and it is made as [record / the TOC data which a user needs there / at any time]. In the case of the usual mini disc, the address etc. of the tune number currently recorded are recorded on this UTOC region.

[0020]The contents of 3 cluster repetition ***** are recorded more on the UTOC region located in the most inner circumference of recordable MD by details. The address information of each data tracks into which the sector 0 was compressed by ATRAC as for the contents currently recorded on the UTOC region, The sector 1 has become like each track name (track name) according [according to / according to / in each track name (track name) by the alphabet (ASCII code), and the sector 2 / the sound recording time of each track / in the sector 3 / ISRC of a track / the sector 4] to ISO-8859-1 or Shift JIS.

In recordable MD, at the time of sound recording, the management information for compressed data (address information of the track with which record of compressed data was made) is recorded on the sector 0, and search of data and playback are performed based on this management information (address information) at the time of playback.

[0021]The format of the sector 0 of a UTOC region is shown in drawing 7. Reference of drawing 7 writes the address which shows the ATRAC data area in a program area per 8 bytes after the 78x4th (sector head shall be 0th byte) byte of sector data.

These 8 bytes each are called an address slot.

Address information which shows the field on a disk to an address slot (and) [start address] End address (End address), a link pointer (Link-P), and the track mode (Track Mode) are written in, and 255 address slots can be set up in a mini disc (MD). That is, a maximum of 255 address information, i.e., a record unit, can be created in the record section of MD.

[0022]The address with which a start address shows the position of the head of a track about each address slot, the address with which an end address shows the position of an end of a track, and a track mode are the definitions in each mode whether the track is a monophonic recording or a stereo. When a track migrates to two or more fields, the start address of the continuation is recorded on link pointer LINK-P.

Read the start address, reproduce succeedingly from there, and in this way in MD. two or more fields the unit of a track not only comprises one continuous field, but divided like the conventional compact disk or a laser disc -- ***** -- it is possible to form one track.

[0023]It points to each address slot with the pointer "P-" which begins from the 11x4+2nd byte. The position of the address slot which pointer P-DFA has a defect on a disk, and directs here the address of the defect region which cannot carry out record reproduction, and P-EMPTY, The position of the address slot which directs the address of the field where the position of the address slot which is not recorded and P-FRA have not been recorded yet, P-TNO1, 2, --255 show the position of the address slot of each track unit, respectively.

[0024]By this the address slot specified with the 12x4+1st byte of pointer "P-TNO1", for example, It means being the slot which described the address of the track 1, and when the data of this POINDA "P-TNO1" is "1", it is shown that the address slot which directs the field of the track 1 is written from the $76 \times 4 + (1) \times 8 = 78 \times 4$ byte position. Similarly, "P-TNO2", "P-TNO3", --, "P-TNO255" show the track 2, the track 3, --, the position of the address slot which directs the field of the track 255, respectively.

[0025]On the other hand, about the defect region which cannot carry out record reproduction normally by a defect, this can be specified by the address slot to which it points by P-DFA (defect pointer). For example, the field which means that the address slot specified with the 11x4+2nd byte of pointer "P-DFA" is a slot which described the defect address as mentioned above, and is directed by this address slot means being a defect field. The calculation method of this pointer "P-DFA" is the same as the calculation method in the track pointer mentioned above. It is possible to carry out a defect field in this way, and to remove it from the object of record and playback in a mini disc device.

[0026]As mentioned above, when one track migrates to two or more fields, or when two or more defect fields exist, two or more fields can be specified as the link pointer in a slot by making the address slot of a continuation specify using two or more address slots.

[0027]The data (management information; TOC data) of this UTOC region is used as follows in ordinary mini disc record / playback equipment at the time of playback. That is, if regeneration is made to start by inserting a mini disc in playback equipment (wearing), and pushing a reproduction button, the value of FirstTNO which is a top track number will be read first. This value usually has many cases of "1", and if it is "1", it will read the track number pointer "P-TNO1" of the track 1. P-TNO2 will be read if this value is "2." Since the position of the address slot which shows the recording area of each track is coded and recorded on P-TNO, according to this code, it goes an address slot to reading.

[0028]The start address (and end address) on the disk of each track, and a track mode byte and a link pointer are recorded on the address slot. Here, a start address and an end address consist of a cluster, a sector, and the sound

group number, and show the position on a disk. A track mode byte shows the attribution information of each track of the existence of an emphasis, a monophonic recording, a stereo, etc., and a link pointer shows the position code of the address slot which shows the field of the continuation, when a track straddles two or more fields on a disk.

[0029]After reading the above information, it accesses to a start address, regeneration is controlled according to track mode byte information, and reproduction to an end address is started. In this regeneration, since one track means straddling two or more fields when a link pointer is except "0", the field of the address slot which this link pointer points out is reproduced continuously. On the other hand, if a link pointer is "0", the track will be an end in the end address, and it will shift from it to the reproduction motion of the continuing track. Thus, predetermined regeneration can be performed using the management information (TOC data) of a UTOC region.

[0030]The TOC data of a UTOC region are used as follows in ordinary mini disc record / playback equipment at the time of record. Namely, insert a mini disc in a recorder (wearing) and a sound recording button is pushed from a halt condition, The address slot which P-FRA will point out first if a record pause condition is used, P-FRA which reads the address slot which P-DFA points out, and the address slot which effective P-TNO points out has pointed out the start address of the free area, and a system controller goes into a sound recording waiting state by one track jump etc., after seeking to the address. A record attribute is set up by a user's operation switch etc. with this (an emphasis, a stereo/ monophonic recording, etc.). The address about a recording track, etc. are described by the slot which the address about a defect field is described by the slot which P-DFA points out, and P-TNO points out, and it is in the state where these were read into the memory, in the sound recording pause condition. A system controller makes record of the data to a free area start, if it goes into a sound recording state (push playback or a pause button by a sound recording pause condition), controlling to be recorded with the attribute specified by a user. A recording position is controlled during sound recording not to overwrite the always recorded address at these as compared with the address of the slot which P-DFA and P-TNO point out. After sound recording

is completed, the recorded address and its attribute are recorded from the slot which P-EMPTY points out, and LastTNO is increased while new P-TNO shows the address slot. For example, when the 4th music is recorded on the disk already recorded three music, P-TNO4 is updated and LastTNO is set to "4." While recording the start address of the free area of a disk on one of the address slots vacant at the end, P-FRA is updated so that the slot may be pointed out, P-EMPTY is updated and recording processing is completed so that an open address slot may be pointed out. Thus, at the time of record of a mini disc, the management information (TOC data) of the recorded data is recorded on a UTOC region.

[0031]

[Problem(s) to be Solved by the Invention]Originally, the mini disc is developed as a noncommercial music medium, though it is a small disk of 64 mm in diameter, by using the audio compression technology called ATRAC, compressed data and has attained the sound recording time for 74 minutes for one CD.

[0032]Although it is going to be accepted also as commercial equipment from the goodness of the operativity, when using as business use, a function in which non-ATRAC data can also be recorded besides the compressed audio data (ATRAC data) based on ATRAC is desired. For example, incompressible digital audio information can be recorded or a recording function of the data based on other compression technology, such as MPEG audio data and AC-3, is desired.

[0033]However, with the conventional mini disc, special data (for example, non compression data, MPEG audio data, etc.) other than the ATRAC data which is coding audio information is recorded on a mini disc, and playing the data is not specified. After recording special data other than ATRAC data on a mini disc, supposing it registers a track into a UTOC region in the same form as usual, When this mini disc is played with conventional mini disc playback equipment, even if the information recorded on the UTOC region is read and it recognizes the track of special data as a track, recognition is impossible as data, an allophone will be generated or playback equipment will carry out abnormal operation. After recording special data other than ATRAC data on a mini disc, supposing it registers a track by

different formation from the former, When this mini disc is recorded with the conventional mini disc recorder, the track of special data cannot be recognized as a track, but ATRAC data is overwritten by the track of special data, or special data is eliminated. Thus, when special data other than ATRAC data was recorded on a mini disc, with the conventional device, there was a fault that there was a problem in record reproduction.

[0034]In the conventional mini disc device, there was a problem that the contents of record (information data) could not be kept secret.

[0035]This invention to some or all of a recording medium (mini disc) Special data other than standard data (compressed data based on ATRAC). It aims at providing the possible recording-medium controlling method, the playback equipment, the recorder, record method, and regeneration method of recording and playing (for example, incompressible PCM audio information) etc., maintaining upward compatibility to an ordinary recording medium (mini disc).

[0036]Namely, record of special data other than standard compressed data (ATRAC data) is possible for this invention to the mini disc as a recording medium, When special data other than ATRAC data is further recorded on the mini disc, Also when playing this mini disc with an ordinary mini disc recording and reproducing device, A device does not receive adverse effects, such as malfunction, with the special data currently recorded on this mini disc, It aims at providing the possible recording-medium controlling method, the playback equipment, the recorder, record method, and regeneration method of the special data currently recorded on the mini disc preventing being overwritten and eliminated by an ordinary recording and reproducing device.

[0037]An object of this invention is to provide the possible record method, the regeneration method, the recorder, and playback equipment of keeping secret and protecting the specific contents of record (information data).

[0038]

[Means for Solving the Problem]To achieve the above objects, in claim 1, claim 2, and the invention according to claim 3. When a recording medium which can record not only standard data but special data on the record/playback

equipment only for a recording medium which records only standard data is set, So that a field where special data is recorded may be hidden for the record/playback equipment only for a recording medium which records only standard data and a field where special data is recorded may be protected from this record/playback equipment, Since a field where special data is recorded is managed, also when recording standard (compression) data and special data on one recording medium, In a recording medium, standard (compression) data and special data can be made to be able to live together without confusion, and record of standard (compression) data to this recording medium and special data and management of reproduction motion can be performed easily.

[0039]Since this defect field is specified as a defect field of a true defective part identifiable when specifying a field where special data is recorded as a defect field in the invention according to claim 4, Also when specifying a field where special data is recorded as a defect field, this can be made to distinguish from a field of a true defective part.

[0040]When recording standard data on a recording medium in claim 5 and the invention according to claim 6, Management information which pinpoints a field where standard data is recorded on a management domain of a recording medium, When writing in so that this management information may be what directs a standard data record section, and recording special data other than standard data, or when a defective part is contained on a recording medium, Management information which pinpoints a field where special data is recorded on a management domain of a recording medium, Management information which pinpoints a field of a defective part on a recording medium is written in a management domain so that such management information may be what directs a defect field on a recording medium, When recording special data, add identification information of a purport that it is special data to the above-mentioned management information, and this management information is written in a management domain, When recording a field of a defective part on a recording medium, identification information of a purport that it is a true defect field is added to the above-mentioned management information, and this management information is written in a management

domain. It is made to recognize whether it is a thing concerning [whether each management information recorded on a management domain is a thing about standard data, and] a defect field by this, When recognized as a defect field, it becomes possible to make it recognize whether it is a thing concerning [whether it is a thing about special data and] a true defect field of this.

[0041]Management information is read in a management domain of a recording medium in claim 7 and the invention according to claim 8, When read management information is judged to be what directs a field where standard data was recorded, When data of this field is recognized as standard data, regeneration for standard data is performed and read management information is judged to be what directs a field where special data was recorded, Data of this field is recognized as special data, and when management information which performed and read regeneration for special data is judged to be what directs a true defect field, it does not regenerate about data of this field. Thereby, also when standard data and special data are intermingled and recorded in one recording medium, standard data and special data can be correctly reproduced from this recording medium.

[0042]In claim 9, claim 10, and the invention according to claim 13. When recording information data which keeps it secret, or when a defective part is contained on a recording medium, Management information which pinpoints a field where information data which keeps it secret from a management domain of a recording medium is recorded, Management information which pinpoints a field of a defective part on a recording medium is written in a management domain so that such management information may be what directs a defect field on a recording medium, When recording information data which keeps it secret, When adding identification information of a purport that it is information data which keeps it secret from the above-mentioned management information, and writing this management information in a management domain and recording a field of a defective part on a recording medium, identification information of a purport that it is a true defect field is added to the above-mentioned management information, and this management information is written in a management domain. Thereby, specific information data

can be kept secret and protected.

[0043]In claim 11, claim 12, and the invention according to claim 14. When it is judged that it is what directs a field where information data which reads management information in a management domain of a recording medium, and in which read management information does not keep it secret was recorded, When it is judged that it is what directs a field where data which reproduces information data of this field, and in which read management information keeps it secret was recorded, or a true defect field, data of this field is kept secret and it does not regenerate about data of this field. Thereby, specific information data can be kept secret and protected.

[0044]

[Embodiment of the Invention]Hereafter, one embodiment of this invention is described based on a drawing. Drawing 8 is a figure showing the example of composition of the record/playback equipment concerning this invention. In drawing 8, the same numerals are given to the same part as drawing 1. Fundamentally, although record/playback equipment of drawing 8 are a thing of the same composition as the record/playback equipment shown in drawing 1, Also recording / reproducing the data of the request of those other than standard compressed data (ATRAC data) besides standard data (standard compressed data (ATRAC data)) is further constituted from record/playback equipment of drawing 8 by the recording medium 100 possible.

[0045]Namely, in record/playback equipment of drawing 1 with record/playback equipment of drawing 8, Special data other than standard compressed data (ATRAC data). (For example, incompressible PCM audio information) etc. are incorporated in a device, The special data interface means (special data capture means) 9 for making it output from a device, In the switching part 10, are provided so that the ATRAC section 4 (data processing means) and a change are possible, and the controller (CPU) part 8, Besides the control management to compressed data (ATRAC data), further, When also performing control management to special data and performing record of standard compressed data (ATRAC data), and reproduction to the recording medium 100, While changing the switching part 10 so that the ATRAC section 4 may be used, when performing record of special data, and reproduction, the switching part 10 is

changed so that not the ATRAC section 4 but the special data interface means 9 may be used.

[0046]Here as the special data interface means 9, For example, a first in first out FIFO memory is used, special data is once buffered in this FIFO memory at the time of record or reproduction, a predetermined synchronization is taken, and it gives the shockproof memory controller 6 or the digital audio interface 20. In record/playback equipment of drawing 8, further, although the drive mechanism of the recording medium 100, servomechanism, and an optical system are needed, since it is easy about these, the graphic display is omitted.

[0047]With such record/playback equipment, further, special data other than standard compressed data can also be recorded besides standard compressed data on the recording medium 100, and it can reproduce to it.

[0048]In this invention, to the recording medium (mini disc) 100, besides standard compressed data (ATRAC data), When special data other than standard compressed data is also recorded, Special data this recorded recording medium (mini disc) 100 for example, when setting in ordinary record/playback equipment (record/playback equipment only for a recording medium which records only standard compressed data (ATRAC data)) as shown in drawing 1, The field where special data was recorded for ordinary record/playback equipment is hidden, and he is trying to manage the field where special data was recorded so that the field where special data was recorded may be protected from ordinary record/playback equipment.

[0049]If it puts in another way, when also recording special data other than standard compressed data on the recording medium 100 further besides standard compressed data in this invention, The management information for standard compressed data (TOC data) is a heterogeneous gestalt, and the management information for special data (TOC data) is made to record on the management domain (for example, UTOC region) of the recording medium 100 with which the management information for standard compressed data is recorded.

[0050]Specification has become possible by making into a defect field the field where special data is more concretely recorded on the management domain of the recording medium with which the management information for

standard data is recorded.

[0051]When specifying the field where special data is recorded as a defect field, this defect field can be specified as the defect field of a true defective part identifiable.

[0052]Drawing 9 is a figure showing the example of composition for recording special data on the recording medium (mini disc) 100 in the record/playback equipment concerning this invention. This recorder is provided with the following in order to record special data on the recording medium (mini disc) 100, if drawing 9 is referred to.

The memory input means 12 which memorizes the special data from the special data interface means 9 to the predetermined memory means 11.

The special data writing means 13 which writes the special data memorized by the memory means 11 in the recording medium 100.

The UTOC memory measure 14 which memorizes the information (TOC data, such as track address information etc. of the special data written in the recording medium 100 by the special data writing means 13) about the field of the recording medium 100 with which special data was recorded.

The information for special data (TOC data, such as track address information of special data) memorized by the UTOC memory measure 14 so that the field where special data was recorded may be recognized as a defect field (field which forbids record and reproduction), The UTOC writing means 15 written in the ordinary portion (sector 0) of a UTOC region.

[0053]Here, the UTOC region writing means 15 has become as [specify / this defect field / as the defect field of a true defective part / identifiable], when specifying the field where special data is recorded as a defect field.

[0054]In the record/playback equipment concerning this invention, drawing 10 is a figure showing the example of composition for reproducing the special data currently recorded on the recording medium. If drawing 10 is referred to, in order to reproduce the special data currently recorded on the recording medium, this playback equipment is provided with the following.

The UTOC reading means 16 which reads the TOC data of the predetermined part (sector 0) of the UTOC region of a recording medium.

The UTOC memory measure 17 which memorizes the TOC data of the portion (sector 0) of the read UTOC region. The inside of the TOC data of the portion (sector 0) of the UTOC region memorized by the UTOC memory measure 17, The special data reproduction means 18 which reads the special data currently recorded on the recording medium 100 based on the TOC data currently identified as what is different from a true defective part in the TOC data which specify this defect field with reference to the TOC data which specify a defect field, and is reproduced.

[0055]In the recorder of drawing 9, and the playback equipment of drawing 10, to the memory means 11, the UTOC memory measure 14, and the UTOC memory measure 17. A part of shockproof memory 5 shown in drawing 8 can be used, The memory input means 12, the special data writing means 13, the UTOC writing means 15, the UTOC reading means 16, and the special data reproduction means 18 are realizable with the controller part (CPU) 8 and the shockproof memory controller 6 in drawing 8.

[0056]In this case, the memory input means 12, the special data writing means 13, the UTOC writing means 15, the UTOC reading means 16, and the special data reproduction means 18, It is made to be the same as that of the case where record of standard compressed data (ATRAC data) and the TOC data of the UTOC region, read-out, and reproduction are performed, A means to be able to perform record of special data and the TOC data of the UTOC region, read-out, and reproduction, therefore to perform record of ATRAC data and the TOC data of the UTOC region, read-out, and reproduction for each of these means can be shared.

[0057]Drawing 11 is a shown figure the example of composition of the shockproof memory 5, and in the example of drawing 11. Standard compressed data (ATRAC data) and special data, It memorizes in the main data area of address "NU"- "N-1" of the shockproof memory 5, standard compressed data (ATRAC data) -- the management information (TOC data) of business, and the management information for special data (TOC data) -- the address of the shockproof memory 5 -- " -- it memorizes to the field of 0"- "NL."

[0058]Thus, in the recorder of this invention, and a record

method. When recording standard data (ATrac data), Write in the TOC data which pinpoint the position of each track of the field where standard data is recorded on a UTOC region, and it is made to recognize as standard data tracks (ATrac data tracks), When recording special data (non-ATrac data) other than standard data (ATrac data), or when a defective part is contained on a disk, and when, The TOC data which pinpoint the position of each track of the field where special data is recorded on a UTOC region, The TOC data which pinpoint the position of each track of the field of the defective part on a disk, It writes in so that these TOC data may be what directs a defect field, When recording special data (non-ATrac data), to the above-mentioned TOC data. When adding the recognition signal of the purport that it is special data, and writing in a UTOC region and recording the field of the defective part on a disk, the recognition signal of the purport that it is a true defect field is added to the above-mentioned TOC data, and it writes in a UTOC region. It is made to recognize whether it is a thing concerning [whether each TOC data are the things about standard data (ATrac data), and] a defect field by this, When recognized as a defect field, it becomes possible to make it recognize whether it is a thing concerning [whether it is a thing about special data and] a true defect field of this.

[0059]By making the above recording, in the playback equipment of this invention, and a regeneration method. When TOC data are read from the UTOC region of a recording medium and the read TOC data are judged to be what directs the track with which standard data (ATrac data) was recorded, Change the switching part 10 to the ATrac section 4, and regeneration for standard data is performed, When the read TOC data are judged to be what directs the track with which special data (non-ATrac data) was recorded, It can avoid regenerating, when the TOC data which changed the switching part 10 to the special data interface means 9, and performed regeneration for special data, and were read are judged to be what directs a true defect field.

[0060]In order to specifically hide and protect the track which recorded special data other than ATrac data by this invention, In the sector 0 of the UTOC region shown in drawing 7, the address slot about the track which recorded

special data, Without specifying with a track number pointer (P-TNO). [whether it specifies by defect address pointer P-DFA, and] Or the track mode byte information on the address slot which was specified by the address slot of the continuation of the above-mentioned defect address slot shown by link pointer LINK-P, and the pointer specified is set to the state of differing from a true defect (it is true) field.

[0061]For example, by making the bit d4 of this track mode byte information into the value which is not set up in an ordinary mini disc, i.e., "1", This is distinguished from a true defect field and a pause of the track shown in the defect field in this way is further expressed using the bit d5 of this track mode byte information.

[0062]Drawing 12 is a figure for explaining the treatment of each bit of d4 of a track mode byte, d5, and d6. Here, d4 refers to the 4th bit from MSB, d5 refers to the 5th bit from MSB, and d6 refers to the 6th bit from MSB so that drawing 7 may show.

[0063]When drawing 12 is referred to and d4 is "1", it is shown that the address slot is a protection track (reserved, concealed Track). When d5 is "1", at the time of public presentation (protection release), the portion of a continuation exists in the track concerned and it is shown that the slots which link pointer LINK-P of the address slot shows are some same tracks. When d5 is "0", it shall be shown at the time of public presentation that the track concerned is completed by the address slot. When d6 is "1", the tracks concerned are ATRAC data tracks, and when d6 is "0", the track concerned presupposes that they are special data tracks (for example, incompressible PCM audio track) other than ATRAC. About d4 and d5, it shall have an above meaning at the time of the address slot shown by defect pointer P-DFA or its link pointer LINK-P.

[0064]Drawing 13 is a figure showing the example of record of the UTOC region of a mini disc. In the example of drawing 13, since the head track number FirstTNO (00000001) is "1", it reads track number pointer P-PTNO1 (00000001) of the track 1 (Track1), The data of the track 1 can be accessed by the address slot (slot from $76 \times 4 + 1 \times 8 = 78 \times 4$) specified by this track number pointer P-TNO1.

[0065]In the example of drawing 13, this final track number

LastTNO (00000011) is "3", and it is shown that record of three music is made. Therefore, refreshable tracks are three tracks of Track1, Track2, and Track3 in ordinary mini disc playback equipment in this case, The address slot about Track2 and Track3, It can deduce by track number pointer P-TNO2 (00000010) and P-TNO3 (00000011) like the address slot about Track1 as the slot from 80x4, and a slot from 82x4.

[0066]If the track mode byte of the address slot (slot from $76x4 + 4x8 = 84x4$) specified by defect address pointer P-DFA (00000100) is further referred to in the example of drawing 13, Since d4 of this track mode byte is "1", it is shown that it is the track (Concealed Track) from which the track directed by this address slot was protected. Since d5 of the track mode byte of this address slot and d6 are "1" and "0", respectively, It is data tracks other than ATRAC data, and it turns out that the address shown by link pointer LINK-P is a portion of a continuation of the track kept secret. Then, if link pointer LINK-P (00000101) of this address slot (slot from 84x4) is seen, The slot ($76x4 + 5x8 = 86x4$) from continuing (86x4) is pointed out, Since d4 of the track mode byte of that slot is "1" and d5 and d6 are "0" and "0", respectively, that is a portion of a continuation of the above-mentioned protection track, and ending the protection track concerned by this slot is shown. If link pointer LINK-P (00000110) of this address slot (slot from 84x4) is seen, The slot ($76x4 + 6x8 = 88x4$) from continuing (88x4) is pointed out, d4 of the track mode byte of the slot is "1", and since d5 and d6 are "0" and "0", respectively, it turns out that it is all a part of the special data tracks protected to the address slot from (88x4). If link pointer LINK-P (00000111) of the address slot from (88x4) is seen, The slot ($76x4 + 7x8 = 90x4$) from continuing (90x4) is pointed out, Since d4 of the track mode byte of the slot is "0", it can be recognized as the address slot from (90x4) being what directs a true defect field (defective area).

[0067]Recording parts other than ATRAC data are recognized as a defect field, are protected, and are read, and it becomes impossible thus, to overwrite them with ordinary mini disc record / playback equipment according to the recording-medium controlling method of this invention. By on the other hand, the thing for which the track mode byte of the address slot of that continuation shown by this defect

address pointer P-DFA or link pointer LINK-P is read in record/playback equipment of this invention. It can be distinguished whether it is the protected field where the slot's being what directs a true defect field, or special data was recorded, and if it is the protected field, it will become possible by reproducing that as a track to reproduce special data.

[0068]Therefore, in such a recording-medium controlling method of this invention, a recorder (record method), and playback equipment (regeneration method). Based on the TOC data of the sector 0 of UTOC, it becomes record (sound recording) and renewable like [special data / (for example, incompressible PCM audio information) / other than ATRAC data] ATRAC data.

[0069]By specifying the field where special data is recorded as a defect field as the sector 0 of a UTOC region, ordinary record/playback equipment, Since the field where the field where special data is recorded is recognized as a defect field, and special data is recorded is not referred to when performing reproduction or record of ATRAC data with reference to a UTOC region, Also when special data is recorded on the recording medium, this special data is read accidentally, a noise is not generated and standard data (ATRAC data) new to the special data currently recorded is not overwritten. Namely, special data (for example, incompressible PCM audio information) other than the ATRAC data of the mini disc (MD) recorded with record/playback equipment of this invention (sound recording), Since it is hidden and is protected from the conventional record/playback equipment (for example, MD recorder), this being wrong, and being read, or being overwritten and eliminated is lost.

[0070]If it puts in another way, in order to specify the field which recorded special data as a defect field in the sector 0 of a UTOC region in this invention, When this recording medium is used for ordinary mini disc record / playback equipment, the field which recorded special data is judged to be a defect field (keepout area of record and playback), Record to the field which recorded special data, and reproduction are not performed, but only the ATRAC data recorded on other fields can be recorded, and it can reproduce.

[0071]Thus, in this invention, maintaining upward

compatibility to the format of the present mini disc. As opposed to this recording medium (recording medium with which not only ATRAC data but special data is recorded (mini disc)), Ordinary record/playback equipment (mini disc recording and reproducing device) can perform record of ATRAC data, and playback, and record of both ATRAC data and special data and playback can be performed with the record / playback equipment only for this recording medium, i.e., record/playback equipment of this invention. For example, as high record of tone quality is carried out, although the signal which carried out speech compression is recorded for a long time using record/playback equipment of this invention, or it is short-time record, The data of several kinds of formats according to the purpose is made to record on the same recording medium using the same record/playback equipment, and it becomes possible to reproduce.

[0072]To the former, for example, JP,6-295532,A. The art which can play the usual mini disc in a MD-Audio format (MD) in which an ATRAC audio signal is recorded, and the disk with which the MD-DATA formats on which a video data and OD data are recorded with the MPEG system differ with one set of playback equipment is shown. Namely, in the art of JP,6-295532,A. The mini disc of two or more sheets of a mutually different kind currently recorded in a format which playback equipment is a MD-DATA drive and is different, When playing with one set of playback equipment, he reads a program compatible with the format of the data from the memory of exclusive playback equipment, and is trying to play data based on the identification data currently beforehand recorded on the UTOC region of the mini disc.

[0073]However, in the playback equipment of JP,6-295532, A, the disk with which two or more kinds of data of a format different mutually [of what can play two or more disks in a mutually different format with one set of playback equipment] is recorded is unreproducible.

[0074]On the other hand, in this invention, one set of record/playback equipment can also perform record of the disk with which two or more kinds of data of a mutually different format is recorded, and playback.

[0075]Namely, in this invention, make the mini disc of one sheet intermingled, and are recordable ATRAC data and special data other than ATRAC data, and in the playback

equipment of this invention. This mini disc (that is) He is trying for ATRAC data and special data other than ATRAC data to play ATRAC data and special data of each other identifiable from this mini disc only based on the TOC data recorded on the UTOC region of the recording medium of one sheet of this invention recorded by being intermingled, Therefore, only by ** referring to the UTOC region of a mini disc in the playback equipment of this invention not using a special program etc., ATRAC data or special data is renewable, maintaining upward compatibility to the present mini disc from the mini disc in which ATRAC data and special data were intermingled.

[0076]In the art of JP,6-295532,A, For MD disk for audios, and MD disk for data, data (special data) other than ATRAC data, When it is recorded on MD disk for data in a MD-DATA format and plays the special data, a MD-DATA drive must be used. In this case, controllers, such as a personal computer with which a MD-DATA drive controls a SCSI (Small Computer System Interface) interface, It is necessary to add the DSP (Digital Signal Processor) board for signal processing, etc. Thus, since additional equipment other than playback equipment is needed, starting of a system takes time and it enlarges as a system. On the other hand, in this invention, special data other than ATRAC data is also recorded on MD disk for audios in a MD-Audio format, and can perform record reproduction of special data, such as linear audio information, by performing slight reconstruction to the usual MD recorder. Therefore, the miniaturization as a recording and reproducing device and stand-alone-ization (single-operation-izing) are attained, and it is effective.

[0077]Drawing 14 is a figure showing the recording-medium controlling method of this invention, and the example of the mini disc recording and reproducing device which applied record/playback equipment. When drawing 14 is referred to, this mini disc recording and reproducing device, The mini disc as the recording medium 100 is rotated with the spindle motor 42, Data is recorded by carrying out the seal of approval of the modulation magnetic field according to record data by the magnetic head 44 as opposed to the mini disc 100 in the state where it irradiated with the laser beam from the optical head 43, Information is played in magneto-optics by tracing the recording track of

the above-mentioned mini disc 100 by a laser beam, for example by the above-mentioned optical head 43.

[0078]Here, the optical head 43 consists of optics, photodetectors, etc., such as a laser light source and a lens, and is provided in the opposite side in the magnetic head 44 to the above-mentioned mini disc 100. The output (output from a photodetector) from the above-mentioned optical head 43, It is added to the playback amplifier (RF amplifier) 46, and in the playback amplifier 46. While extracting a focus error signal and a tracking error signal from the output of the above-mentioned optical head 43 and giving the servo control circuit 45, a regenerative signal is binary-ized, and the decoder (EFM decoder) 77 is supplied.

[0079]The servo control circuit 45 comprises a focus servo, a tracking servo, a spindle servo, a slide servo control circuit, etc., for example, A focus servo and a tracking servo control circuit control, respectively so that a focus error signal and a tracking error signal are set to 0, and they have the function to make the focus of a laser beam trace correctly to a recording track. A spindle servo control circuit controls the spindle motor 42 to make the mini disc 100 rotate with predetermined revolving speed. That is, a spindle servo control circuit controls the spindle motor 42 to make the mini disc 100 rotate with predetermined revolving speed with ATRAC data and special data (for example, incompressible PCM data), respectively. The slide servo control circuit has a function for which the optical head 43 and the magnetic head 44 are moved to the object track of the mini disc 100 specified by the system controller (CPU) 47. The servo control circuit 45 supplies the information which shows again the operating state of above each part of several kinds by which servo control is carried out to the system controller (CPU) 47.

[0080]The keyboard 48 is connected to the system controller (CPU) 47, and from this keyboard 48. Being able to carry out input specification of the operational modes (a recording mode, reproduction mode, etc.) of this recording and reproducing device, according to the operational mode by which input specification is carried out from the keyboard 48, the system controller (CPU) 47 performs record control and reproduction control. The system controller (CPU) 47 manages the position which the optical head 43 and the magnetic head 44 are tracing based on the address

information (for example, a sector, a cluster, a sound group) currently recorded on the UTOC region of the mini disc 100. The display 49 is connected to the system controller (CPU) 47, and record or regeneration time is displayed based on the address information (for example, a sector, a cluster) of the mini disc 100.

[0081]In order to perform recording processing in this recording and reproducing device, A low pass filter. (LPF) 61, A/D converter 62, ATRAC encoder (compressor) 63, FIFO memory 64, the data selector (changeover switch) 65, RAM(random access memory) 66, the encoder (EFM encoder) 67, and the magnetic head driving circuit 68 are formed.

[0082]In order to regenerate, The decoder (EFM decoder) 77, RAM(random access memory) 78, the ATRAC decoder (stretcher) 79, FIFO memory 80, the data selector (changeover switch) 81, D/A converter 82, and the low pass filter (LPF) 83 are formed.

[0083]The system controller 47 is equivalent to the controller part 8 and the shockproof memory controller 6 in drawing 8 here, ATRAC encoder 63 and the ATRAC decoder 79, Correspond to the ATRAC section 4 in drawing 8, and FIFO memories 64 and 80 correspond to the special data interface means 9 in drawing 8, The data selectors (changeover switch) 65 and 81 correspond to the switching part 10 in drawing 8, RAM 66 and 78 is equivalent to the shockproof memory 5 in drawing 8, and the encoder 67 and the decoder 77 support the EFM encoder / decoder section 7 in drawing 8.

[0084]Next, the processing operation of the mini disc recording and reproducing device of such composition is explained.

[0085]When record of the data to the mini disc 100 inserted in this mini disc recording and reproducing device (wearing) is made in this mini disc recording and reproducing device, First, the low pass filter 61 is passed, it is sampled and quantized by A/D converter 62, and inputted analog input signal A_{in} is outputted to ATRAC encoder 63 and FIFO memory 64.

[0086]The cut-off characteristic is set up and the above-mentioned low pass filter 61 prevents an aliasing noise so that 1/2 or more frequency components of a sampling

frequency may often be intercepted. Above-mentioned ATRAC encoder 63 will perform the data compression of an ATRAC method to this digital data, if the digital data (for example, PCM digital audio information) of a predetermined sampling frequency (for example, 44.1 kHz) is sent from A/D converter 62. If the sampling frequency of A/D converter 62 is not 44.1 kHz, it is necessary to perform a sampling frequency conversion process to 44.1 kHz, and to supply data to ATRAC encoder 63.

[0087]The digital data (for example, PCM digital audio information) from A/D converter 62 is continuously inputted into above-mentioned FIFO memory 64, and FIFO memory 64 holds this to it.

[0088]Although the compressed data from ATRAC encoder 63 or the data held at FIFO memory 64 is outputted to RAM66 after an appropriate time, The data outputted to RAM66 is either thing of the compressed data from ATRAC encoder 63, and the data from FIFO memory 64, and the data selector 65 chooses these either under control of the system controller 47. The system controller 47, corresponding [namely,] to the state of the record mode switch of the keyboard 48, The data selector 65 is controlled to output the compressed data from ATRAC encoder 63 to RAM66, if it is ATRAC compressed mode, and to output the data from FIFO memory 64 to RAM66, if it is non compression mode.

[0089]Thereby, selection of the compressed data from ATRAC encoder 63 will output the data compressed by ATRAC encoder 63 to RAM66. By ATRAC encoder 63, the digital audio information of 1 sound block for two stereos (512 samples) is coded by 424 bytes, and, specifically, is outputted to RAM66, for example. If the data from FIFO memory 64 is chosen, from FIFO memory 64, data will be read to the timing which RAM66 requires and it will be outputted to RAM66.

[0090]RAM66, writing and read-out of data are controlled by the above-mentioned system controller 47, The data supplied from above-mentioned ATRAC encoder 63 is temporarily memorized at the time of ATRAC mode, The data supplied from FIFO memory 64 is temporarily memorized at the time of incompressible PCM mode, it sends out data to the disk 100 if needed, and records it on the disk 100.

[0091]Concretely, in a mini disc, linking of four sectors and a sub-data sector are added to the data of 32 sectors (74624 bytes), it is considered as one cluster, and this cluster unit performs the reading and writing to the mini disc 100 burstily. Therefore, RAM66 memorizes the data for at least 1 cluster, and supplies data to the EFM encoder 67 by a cluster unit with directions of the system controller 47. It is necessary to make the transfer rate under this burst transmission higher than the average transfer rate of ATRAC data, and to make it higher than the average transfer rate of incompressible PCM data in ATRAC mode, at non compression mode.

[0092]In the EFM encoder 67, the data supplied from RAM66 is encoded in real time at the EFM signal which is a recording format on the disk 100, The magnetic head driving circuit 68 is supplied, and the magnetic head driving circuit 68 drives the magnetic head 44 so that the modulation magnetic field according to the above-mentioned record data may be impressed to the mini disc 100. The system controller 47 controls a recording position to record continuously the above-mentioned record data burstily read from this RAM66 on the recording track of the mini disc 100 while performing the above memory control to RAM66. Control of this recording position manages the recording position of the above-mentioned record data in which the system controller 47 is burstily read from RAM66, and is performed by supplying the control signal which specifies the recording position of the above-mentioned mini disc 100 to the servo control circuit 45.

[0093]Furthermore, if the system controller 47 is supervising the state of the keyboard 48 and has operation of a sound recording stop, after making the recording processing of the input signal of the time complete, it will perform track registration processing to a UTOC region. This is the same as the registration processing to the UTOC region of the ordinary mini disc mentioned above, except that d6 of a track mode byte is set to "0" at the time of record of special data (non compression data). Namely, at the time of record of the standard data (compressed data) from ATRAC encoder 63. "1" is set as d6 of the track mode byte of an address slot who specifies the address of the recording track of this standard data, At the time of record of the special data (non compression data) from FIFO

memory 64. Except setting "0" as d6 of the track mode byte of an address slot who specifies the address of the recording track of this special data, it is the same about the recording processing of the TOC data to a UTOC region at standard data and special data.

[0094]After doing in this way and making recording processing in the mini disc recording and reproducing device of drawing 14, For example, at the time of discharge (extraction) of the mini disc 100 from this mini disc recording and reproducing device, the system controller 47 performs rewriting processing (update process) of the TOC data of a UTOC region. Drawing 15 is a flow chart which shows the processing flow of the rewriting processing of TOC data.

[0095]In this rewriting processing, first, a track is investigated one by one from a top track, and it is judged whether the present track (track number: N) is a track of special data (incompressible PCM data) (Step S51). That is, in the track mode byte of the address slot of the present track (track number: N), it is judged whether d6 is "0."

[0096]As a result, if it is judged that d6 of the track mode byte of the address slot of this track (track number: N) is "0", and this track is a track of special data, The track number pointer (P-TNON) of this track (track number: N) is cleared (Step S52), Then, the address slot of this track is specified by link pointer LINK-P of the address slot specified as the defect pointer (P-DFA) or the defect field (Step S53). The track mode byte of the address slot of this track is updated (Step S54). That is, d4 of the track mode byte of the address slot of this track is set to "1." If the secrecy track concerned is using two or more address slots at this time, it judges whether it is a slot of the last of the track concerned to each of that slot, if it is the last slot, d5 will be set to "0", and d5 will be set to "1" if it is not the last slot. Thereby, protection for one track is ended and it progresses to Step S55.

[0097]In Step S51, when d6 is "1" (track of standard data (ATRAC data)) in the track mode byte of the address slot of the present track, it progresses to Step S55, without performing protection processing of Steps S52 thru/or S54.

[0098]In Step S55, it judges whether the track under processing is a final track, and if it is not a final track, in order to repeat the same processing and to perform it with

having mentioned above about the next track, it returns to Step S51 again. On the other hand, in being a final track, it carries out RINAN burring of the track number of the track of standard data (ATRAC data). For example, when the inside of 5 tracks and two tracks are tracks of special data (incompressible PCM data), Track number pointer P-TNO1, P-TNO2, and P-TNO3 are rewritten so that the address slot of the three remaining tracks (track of standard data) may be directed, respectively. FirstTNO is set to "1" and LastTNO is updated to "3" (Step S56). Thus, the rewriting processing of the TOC data of a UTOC region is completed.

[0099]In the mini disc recording and reproducing device of drawing 14, the system controller 47 performs an initial setting to this mini disc at the time of insertion (wearing) of the mini disc to this mini disc recording and reproducing device. Drawing 16 is a flow chart which shows the processing flow of an initial setting.

[0100]In an initial setting, LastTNO is checked first (Step S71). That is, the last track number (track number) is found out and let the initial value of the track number of the track of the special data (incompressible PCM audio information) exhibited (protection release) be (the last track number+1). Next, d4 of a track mode byte extracts the slot of "1" in the address slot which the address slot (address slot shown by P-DFA) and its link pointer LINK-P of a defect field point out (Step S72). When d4 is able to extract the slot of "1", the address slot is specified with a new track number pointer (P-TNO) (Step S73). For example, if it will specify by P-TNO4 and open processing of the track 4 will already be performed supposing there is a track of standard data (ATRAC data) to 3, it will specify by P-TNO5. Then, defect address pointer P-DFA which points out the address slot concerned, or link pointer LINK-P of a defect address slot is updated so that the address slot concerned may be removed from a defect address (Step S74). d4 of the track mode byte of the extracted slot is set to "0", and when d5 is "1", this is returned to "0" (Step S75). When d5 is "0" from the beginning, link pointer LINK-P of the slot is cleared. By this, open processing of the special data tracks for one track is completed, it returns to Step S52 again, and the following slot is extracted further.

[0101]Thus, extraction of all the protection address slots (slot whose d4 of a track mode byte is "1") is completed,

and if the slot of "1" is lost, d4, The last track number LastTNO is updated so that the track number (track number) which increased by public presentation of special data tracks may also be included (Step S76). For example, when the track of ATRAC data is a disk with which two tracks of tracks of the hidden special data exist 3 tracks, LastTNO is updated to "5." Thus, public presentation of the track of the special data protected is completed. It enables the disk which performed this initialization to access the track of special data like the track of ATRAC data.

[0102]Next, the mini disc recording and reproducing device of drawing 14 explains the operation which plays the recording medium (mini disc) with which standard data (ATRAC data) and special data (incompressible PCM data) were recorded using the flow chart of drawing 17. For example, if a reproduction button is pushed from the keyboard 48 by an operator (Step S21), the system controller 47 will search the TOC data of the sector 0 of the UTOC region of the recording medium 100 first. That is, as FirstTNO and LastTNO are checked (Step S22) and it mentioned above after an appropriate time based on FirstTNO and LastTNO, P-TNO is checked and an address slot is searched (Step S23). Search one address slot and the start address, the end address, the track mode byte, and the link pointer which are described by this address slot are checked (Step S24). As a result, if d6 of a track mode byte is "1" (Step S25), the system controller 47, It judges that standard data (ATRAC data) is recorded on the track directed by this address slot, and the data selector 81 is controlled so that the output from the ATRAC decoder 79 is sent to D/A converter 82 (Step S26). On the other hand, if d6 of a track mode byte is "0", in Step S25 the system controller 47, It judges that special data is recorded on the track directed by this address slot, and the data selector 81 is controlled so that the output from FIFO memory 80 is sent to D/A converter 82 (Step S27).

[0103]Thus, after one address slot was searched, the kind of data currently recorded on the field (track) directed by this address slot was judged by d6 and processing of Step S26 or Step S27 was made, Even the region (track position) directed by the end address from the region (track position) directed in the start address of this address slot is reproduced (Step S28).

[0104]Specifically, regeneration of Step S28 is made as follows. Namely, the system controller 47 to the track position directed by the end address from the track position directed in the start address of this address slot, It reproduces by controlling by a servo control circuit, the position, i.e., the playback position, of the optical head 43, so that data may be read continuously one by one.

[0105]The reproducing output obtained when the optical head 43 traces the recording track of the mini disc 100, It is binary-ized by the playback amplifier 46, and the EFM decoder 77 is supplied, and the EFM decoder 77 decodes the EFM signal which is a recording format on a disk, and supplies the data of a cluster unit to RAM78. RAM78 is controlled by the system controller 47 by the writing of data, and read-out, and to RAM78. The standard data transmitted by a cluster unit from the EFM decoder 77 (ATRAC data), Or the data which special data (incompressible PCM data) was written in, and was written in RAM78 is read to the timing which the ATRAC decoder 79 needs, and is outputted to the ATRAC decoder 79 and FIFO memory 80.

[0106]The ATRAC decoder 79 decodes the outputted standard data (ATRAC data) to digital data (digital audio data), when standard data (ATRAC data) is outputted from RAM78. FIFO memory 80 memorizes the outputted special data (incompressible PCM data) temporarily, when special data (incompressible PCM data) is burstily outputted from RAM78.

[0107]By d6 [by the way,] of the track mode byte information on an address slot as for which the kind of data under present reproduction specifies the field where this data is recorded as mentioned above. It is distinguished beforehand and processing of Step S26 or S27 is made by whether d6 is "1" or it is "0." Therefore, if d6 is "1" and the kind of data under present reproduction is standard data (ATRAC data), the data from the ATRAC decoder 79 will be sent to D/A converter 82. If d6 is "0" and the kind of data under present reproduction is special data (non compression data), the data memorized by FIFO memory 80 will be sent to D/A converter 82 to timing required for D/A converter 82.

[0108]Therefore, when the data under present reproduction of D/A converter 82 is standard data (ATRAC data), The digital data (digital audio data) from the ATRAC decoder 79

is changed into an analog signal, When the data under present reproduction is special data (incompressible PCM data), the digital data (digital audio data) from FIFO memory 80 is changed into an analog signal, and an analog signal (analog audio signal) is formed. Analog signal A_{out} obtained from this D/A converter 82 is outputted via the low pass filter 83.

[0109]Thus, after performing reproduction about the data currently recorded on the field (track) directed by the start address and end address of one address slot in Step S28, Investigate whether link pointer LINK-P of this address slot is "0" (Step S29), and when this is not "0", The address slot of the continuation shown by this link pointer LINK-P is searched (Step S30), and it returns to Step S24 again, and regenerates similarly about the field (track) directed by the address slot of this continuation.

[0110]In Step S29, when link pointer LINK-P is "0", Investigate whether it is a final track, and when it is not (Step S31) and a final track, In order to check following track number pointer P-TNO and to search the following address slot, it returns to Step S23 again, and regenerates similarly about the field (track) directed by the following address slot.

[0111]On the other hand, in Step S31, in being a final track, it is judged that all reproduction of the data currently recorded on this recording medium was made, and it ends regeneration.

[0112]Thus, by [which specify all tracks as a defect field in part] recording special data other than ATRAC data according to this invention, Even if the ordinary mini disc device which cannot carry out record reproduction is equipped with this disk, only ATRAC data can prevent the track with which special data is recorded being played, or being overwritten, and can protect this track. On the other hand, since the mini disc of this invention is maintaining compatibility with an ordinary mini disc, while it is renewable also with an ordinary mini disc device about the track with which ATRAC data was recorded, ATRAC data is recordable on the free space of a mini disc with an ordinary mini disc recorder.

[0113]According to record/playback equipment of this invention, it can access to the track of special data as well as the track of ATRAC data by performing an initializing

process to the mini disc with which it was equipped. That is, ATRAC data and the other special data can be made to live together without confusion in a mini disc.

[0114]In an above-mentioned embodiment, the compressed data based on AC-3 and the compressed data based on an MPEG audio are considered besides linear PCM data as special data recordable on a mini disc. The compressed data according to AC-3 as special data to a mini disc (MD), Or it becomes possible to record compressed data (special data) on a mini disc (MD) as it is, without performing compression and elongation processing usually needed, when recording the compressed data based on an MPEG audio. Therefore, it is effective in that there is no degradation of the tone quality in special data. For example, the compressed data based on AC-3 recorded on SD (Super Density Disc: DVD of the Toshiba method (Digital Video Disc)), Copy record is carried out at MD and it is effective in that there is no tone quality degradation of the compressed data based on AC-3 which recorded the compressed data recorded on the MD on MD in the case where it holds as backup etc. The same effect is acquired also when carrying out copy record of the MPEG audio recorded on the video CD at MD.

[0115]Drawing 18 is a figure showing other examples of composition of the record/playback equipment concerning this invention. In drawing 18, the same numerals are given to the same part as drawing 1. Fundamentally, although record/playback equipment of drawing 18 are a thing of the same composition as the record/playback equipment shown in drawing 1, It is constituted from record/playback equipment of drawing 18 by the information which keeps it secret from the recording medium 100 by record of information data being possible so that it may be kept secret so that protection is possible, so that this may not be reproduced without permission.

[0116]Namely, in record/playback equipment of drawing 1 with record/playback equipment of drawing 18, The setting means (for example, input means of a keyboard etc.) 30 which specifies whether it is kept secret to the information data recorded, As opposed to the information data which the verifying means (for example, input displaying means of a keyboard, a display, etc.) 31 which performs the permission check for reproducing the information which keeps it secret

is established, and is recorded at the time of record of the information data to the recording medium 100, When there are directions of the purport that the information data which makes it specify from the setting means 30 whether it is kept secret, and does not perform secrecy from the setting means 30 is recorded, The management information which pinpoints the field where the information data which does not keep it secret from the management domain of the recording medium 100 is recorded, It writes in so that it may be what specifies the record section of the information data in which this management information does not keep it secret, When there are directions of the purport that the information data which performs secrecy from the setting means 30 is recorded, or when a defective part is contained on the recording medium 100, and when, The information data which keeps it secret from the management domain of the recording medium 100 the management information which pinpoints the field recorded the management information which pinpoints the field of the defective part on the recording medium 100, When writing in a management domain so that such management information may be what directs the defect field on the recording medium 100, and recording further the information data which keeps it secret, When adding the identification information of the purport that it is information data which keeps it secret from the above-mentioned management information, and writing this management information in a management domain and recording the field of the defective part on a recording medium, It is constituted so that the identification information of the purport that it is a true defect field may be added to the above-mentioned management information and this management information may be written in a management domain.

[0117]If it puts in another way, when recording the information data which keeps it secret on the recording medium 100 in record/playback equipment of drawing 18, The management information for the usual information data (TOC data) which does not keep it secret from the management domain (for example, UTOC region) of the recording medium 100 with which the management information for the usual information data which does not keep it secret is recorded is a heterogeneous gestalt, The management information for information data (TOC data)

which keeps it secret is made to record.

[0118]Specification has become possible by making into a defect field the field where the information data which keeps it secret is recorded on the management domain of the recording medium with which the management information for the usual information data which does not keep it secret is recorded more concretely.

[0119]When specifying the field where the information data which keeps it secret is recorded as a defect field, this defect field is specified as the defect field of a true defective part identifiable.

[0120]Drawing 19 is a figure showing the example of composition for recording information data (information data which performs the information data or the secrecy which does not keep it secret) on the recording medium (mini disc) 100 in record/playback equipment of drawing 18. This recorder is provided with the following in order to record information data on the recording medium (mini disc) 100, if drawing 19 is referred to.

The setting means 30 which specifies whether it is kept secret to the information data which is going to be recorded on the recording medium 100, or the recorded information data.

The writing means 33 which writes the information data which is encoded in the ATRAC section 4 and memorized by the memory means 32 in the recording medium 100.

The UTOC memory measure 34 which memorizes the information (TOC data, such as track address information etc. of the information data written in the recording medium 100 by the writing means 33) about the field of the recording medium 100 with which information data was recorded.

When specification of the purport that it is kept secret by the setting means 30 is made, the information for information data (TOC data, such as track address information of information data) memorized by the UTOC memory measure 34, The UTOC writing means 35 written in the ordinary portion (sector 0) of a UTOC region so that the field where the information data which keeps it secret was recorded may be recognized as a defect field (field which forbids record (for example, overwrite), reproduction, and elimination).

[0121]Here, the UTOC writing means 35 has become as [specify / this defect field / as the defect field of a true defective part / identifiable], when specifying the field where the information data which keeps it secret is recorded as a defect field.

[0122]In record/playback equipment of drawing 18, at the time of reproduction of the information data currently recorded on the recording medium 100. When it is judged that it is what directs the field where the information data which reads management information in the management domain of a recording medium, and in which the read management information does not keep it secret was recorded, When it is judged that it is what directs the field where the data which reproduces the information data of this field, and in which the read management information keeps it secret was recorded, or a true defect field, the data of this field is kept secret and it regenerates about the data of this field.

[0123]However, when it is the field where the data in which the read management information keeps it secret was recorded, only within the case where a permission check is obtained, it can regenerate about the data of this field.

[0124]Drawing 20 is a figure showing the example of composition for reproducing the information data currently recorded on the recording medium in record/playback equipment of drawing 18. If drawing 20 is referred to, in order to reproduce the information data currently recorded on the recording medium, this playback equipment, The UTOC reading means 36 which reads the TOC data of the predetermined part (sector 0) of the UTOC region of a recording medium, The UTOC memory measure 37 which memorizes the TOC data of the portion (sector 0) of the read UTOC region, When it has the reproduction means 38 which reproduces information data, and the verifying means 31 which performs the permission check for reproducing the information data kept secret and a permission check is obtained by the verifying means 31, The inside of the TOC data of the portion (sector 0) of the UTOC region where the above-mentioned reproduction means 38 was memorized by the UTOC memory measure 37, With reference to the TOC data which specify a defect field, the secrecy information data currently recorded on the recording medium 100 based on the TOC data currently identified as a different thing

from a true defective part in the TOC data which specify this defect field is read, and it reproduces.

[0125]Namely, when it is judged that the reproduction means 38 is what directs the field where the information data in which the read management information does not keep it secret was recorded, Regenerate by recognizing as data which does not keep it secret, and the data of this field the reproduction means 38, When it is judged that it is what directs the field where the information data in which the read management information keeps it secret was recorded, Only when the data of this field is recognized as information data which keeps it secret and a permission check is obtained by the verifying means 31, It regenerates about this information data, and the reproduction means 38 regenerates about the data of this field, when the read management information is judged to be what directs a true defect field.

[0126]The setting means 30 comprises record/playback equipment of drawing 18 so that release (public presentation of secrecy information data) of specification of the purport that it is kept secret can also be performed. However, release of specification of the purport that it is kept secret is made by the setting means 30, on condition that the permission check by the verifying means 31 is obtained, for example. If it puts in another way, the appointed release was not made and only the person himself/herself whom the purport that it was kept secret specified, for example has come.

[0127]In the recorder of drawing 19, and the playback equipment of drawing 20, to the memory means 32, the UTOC memory measure 34, and the UTOC memory measure 37. A part of shockproof memory 5 shown in drawing 18 can be used, and the controller part (CPU) 8 and the shockproof memory controller 6 can realize the writing means 33, the UTOC writing means 35, the UTOC reading means 36, and the reproduction means 38 in drawing 18.

[0128]Thus, in the recorder of this invention, and a record method. When recording the information data (ATRAC data) which does not keep it secret, Write in the TOC data which pinpoint the position of each track of the field where the usual information data is recorded on a UTOC region, and it is made to recognize as usual information data tracks (ATRAC data tracks), When recording the information data (ATRAC data) which keeps it secret, or when a defective part is contained on a disk, and when, The TOC data which

pinpoint the position of each track of the field where the information data which keeps it secret from a UTOC region is recorded, The TOC data which pinpoint the position of each track of the field of the defective part on a disk, It writes in so that these TOC data may be what directs a defect field, When recording the information data which keeps it secret, to the above-mentioned TOC data. When adding the recognition signal of the purport that it is information data which keeps it secret, and writing in a UTOC region and recording the field of the defective part on a disk, the recognition signal of the purport that it is a true defect field is added to the above-mentioned TOC data, and it writes in a UTOC region. It is made to recognize whether it is a thing concerning [whether each TOC data are the things about the information data which does not keep it secret, and] a defect field by this, When recognized as a defect field, it becomes possible to make it recognize whether it is a thing concerning [whether it is a thing about the information data in which this keeps it secret, and] a true defect field.

[0129]By making the above recording, in the playback equipment of this invention, and a regeneration method. When it is judged that it is what directs the track with which the information data which reads TOC data from the UTOC region of a recording medium, and in which the read TOC data do not keep it secret was recorded, When it is judged that it is what directs the track with which the information data in which the TOC data regenerated and read keep it secret was recorded, Or when the read TOC data are judged to be what directs a true defect field, it can avoid regenerating. However, when it is judged that it is what directs the track with which the information data in which the read TOC data keep it secret was recorded and a permission check is obtained from the verifying means 31, it can regenerate.

[0130]That is, in this invention, a user can perform the input which specifies public presentation or disclosure of each track as a UTOC region, respectively, before recording data on the recording medium 100, or after recording in order to keep data secret. And when record reproduction is performed to this recording medium 100, for example, MD, using the conventional MD player, to the field where the data currently exhibited is recorded, can perform the usual

record reproduction and elimination, but. Record reproduction and elimination cannot be performed to the field where the data which is not exhibited is recorded, but the data which is not exhibited can be protected.

[0131]The person in question who made the track disclosure, for example when record and reproduction were performed to this MD using record/playback equipment of this invention, By entering a password etc. from the verifying means 31, in spite of not being opened to the public, record of all the data, reproduction, and elimination can be performed. On the other hand, other than the person in question who made the track disclosure, since a right password etc. cannot be entered from the verifying means 31, record, reproduction, and elimination cannot be performed. Only the person in question who made the track disclosure can specify public presentation or disclosure of a secret track anew, for example using the setting means 30 and the verifying means 31.

[0132]In order to specifically keep secret the track which recorded information data by this invention, The address slot about the track (secrecy track) which recorded the information data which keeps it secret in the sector 0 of the UTOC region shown in drawing 7, Without specifying with a track number pointer (P-TNO). [whether it specifies by defect address pointer P-DFA, and] Or the track mode byte information on the address slot which was specified by the address slot of the continuation of the above-mentioned defect address slot shown by link pointer LINK-P, and the pointer specified is set to the state of differing from a true defect (it is true) field.

[0133]For example, this is distinguished from a true defect field by making the bit d4 of this track mode byte information into the value which is not set up in an ordinary mini disc, i.e., "1." When the secrecy track concerned is using two or more address slots at this time, to each of that slot, if it is a slot of the last of the track concerned, d5 and d6 bit will be carried out 0 or 1, and if it is not the last slot, d5 and d6 bit will be set up as 1 and 1.

[0134]Therefore, also in record/playback equipment of drawing 18, the almost same record as the example of record shown in drawing 13 is made in the UTOC region of a mini disc.

[0135]Recording parts other than the information data

which does not keep it secret are recognized as a defect field, are protected, and are read, and it becomes impossible thus, to overwrite them with ordinary mini disc record / playback equipment according to the record method of this invention, and the regeneration method. By on the other hand, the thing for which the track mode byte of the address slot of that continuation shown by this defect address pointer P-DFA or link pointer LINK-P is read in record/ playback equipment of this invention. It can be distinguished whether it is the protected field where the information data which performs that the slot is what directs a true defect field, or secrecy was recorded, and if it is the protected field, only within the case where a permission check is obtained, it will become possible to perform overwrite of secrecy data, and reproduction. Therefore, others can prevent effectively the situation of overwriting secrecy data and reproducing without notice.

[0136]Drawing 21 is a flow chart which shows an example of secrecy processing which keeps secret the arbitrary tracks which a user specifies to the mini disc after track record (after recording information data) so that others cannot be played.

[0137]In secrecy processing, the track number of the track which which track is kept secret inputs namely, keeps secret first is specified by the setting means 30 (Step S81). As a track number of the track kept secret, if N is specified, for example next, the track number pointer (P-TNON) of the track (track number N) concerned will be cleared (Step S82). Then, the track-address slot for [the] secrecy, i.e., the slot which P-TNON had pointed out, is specified by link pointer LINK-P of a defect address pointer (P-DFA) or a defect address slot (Step S83). The track mode byte of this track-address slot is updated (Step S84). That is, the track mode byte d4 of a secrecy track-address slot is set to 1.

When the secrecy track concerned is using two or more address slots at this time, to each of that slot, if it is a slot of the last of the track concerned, d5 and d6 bit will be carried out 0 or 1, and if it is not the last slot, d5 and d6 bit will be set up as 1 and 1. Thus, the secrecy for one track is ended.

[0138]Then, it is checked whether there is any track to keep secret from others. That is, it is checked whether all track numbers to keep secret have been inputted (Step S85). As a result, if there is a track to keep secret from others, it will

carry out by repeating processing of Steps S81 thru/or S84, and if a track to keep secret from others is lost, RINAN burring of the track number of a track will be carried out (Step S86). For example, so that the address slot of the three remaining tracks may be directed, respectively, if two tracks are kept secret among 5 tracks, That is, track number pointer P-TNO1, P-TNO2, and P-TNO3 are rewritten so that the track number of the three remaining tracks may be set to 1, 2, and 3. Furthermore, FirstTNO is updated to "1" and LastTNO is updated to "3." Thus, secrecy processing is completed. Thus, the disk with which secrecy processing was made can play only the tracks 1, 2, and 3 which remained without being kept secret, unless open processing mentioned later is performed.

[0139]Drawing 22 is a flow chart which shows an example of the secrecy track public presentation processing exhibited to the mini disc in which secrecy processing of some tracks was carried out so that a user can play a secrecy track.

[0140]In secrecy track public presentation processing, LastTNO is checked first (Step S91). That is, the last track number (track number) is found out and let the initial value of the track number of the track exhibited (secrecy release) be (the last track number 1). Next, d4 of a track mode byte extracts the slot of "1" in the address slot which the address slot (address slot shown by P-DFA) and its link pointer LINK-P of a defect field point out (Step S92). When d4 is able to extract the slot of "1", the address slot is specified with a new track number pointer (P-TNO) (Step S93). For example, if it will specify by P-TNO4 and open processing of the track 4 will already be performed supposing there is the usual track (track with which secrecy is not made) to 3, it will specify by P-TNO5. Then, defect address pointer P-DFA which points out the address slot concerned, or link pointer LINK-P of a defect address slot is updated so that the exhibited address slot may be removed from a defect address (Step S94). d4 of the track mode byte of the extracted slot is set to "0", and when the combination of d5 and d6 is 1 and 1, this is returned 0 or 1. When the combination of d5 and d6 is 0 and 1 from the beginning, link pointer LINK-P of the slot is cleared (Step S95). By this, the open processing for one track is completed, it returns to Step S92 again, and the following slot (secrecy track-address slot) is extracted further.

[0141]Thus, extraction of all the secrecy address slots (slot whose d4 of a track mode byte is "1") is completed, and if the slot of "1" is lost, d4, A last track number (LastTNO) is updated and public presentation of all the secrecy tracks is completed so that the track number (track number) which increased by public presentation of the secrecy track may also be included (Step S96).

[0142]Thus, in the device of drawing 18, about a secrecy track, unless open processing is performed, secrecy protection of this can be carried out so that neither reproduction nor overwrite may be made. And the track kept secret can be returned to the refreshable usual state by performing open processing. By attaching conditions to open processing etc., on condition that a password is entered, for example and it is in agreement with it, specifically, it can return to a refreshable state.

[0143]That is, although public presentation or secret selection can be performed to all the tracks and this can be recorded, reproduced and eliminated about the data currently exhibited, record, reproduction, and elimination cannot be performed to the data which is not exhibited, but secrecy of record data can be performed. In order to check the data in which the usual MD player kept it secret as a defect field, it does not read the data which kept it secret accidentally, and does not newly overwrite data. Thus, record of other signal data and reproduction can be performed, having usual MD and compatibility.

[0144]Although the function of both reproduction and record is equipped, it can also constitute from drawing 8, and record/playback equipment of drawing 18 as a recorder which could also constitute this as playback equipment provided only with the regenerative function, and was provided only with the recording function. That is, it can also constitute as a respectively separate device like drawing 8, the playback equipment which has only a regenerative function for each device of drawing 18, and a recorder only with a recording function.

[0145]In constituting as playback equipment only with a regenerative function here, The ATRAC section 4, and the EFM encoder / decoder section 7 have a function of a decoder at least, and the digital audio interface 20 should just have [just] a transmission output function of a digital audio interface signal at least.

[0146]In constituting as a recorder only with a recording function, The ATRAC section 4, and the EFM encoder / decoder section 7 have a function of an encoder at least, and the digital audio interface 20 should just have [just] a receiving function of a digital audio interface signal at least.

[0147]Although it presupposed that the recording medium 100 is a mini disc in the above-mentioned embodiment, this invention is also applicable not only to a mini disc but arbitrary recording media.

[0148]In drawing 21 and the example of processing of drawing 22, after track record was made (i.e., after record of information data is made), specify keeping it secret to the track (information data) with which record was made, but. It is also possible for track record to precede to be made, namely, for record of information data to precede to be made, and to specify to keep it secret.

[0149]

[Effect of the Invention]As explained above, according to claim 1, claim 2, and the invention according to claim 3. When the recording medium which can record not only standard data but special data on the record/playback equipment only for a recording medium which records only standard data is set, So that the field where special data is recorded may be hidden for the record/playback equipment only for a recording medium which records only standard data and the field where special data is recorded may be protected from this record/playback equipment, Since the field where special data is recorded is managed, also when recording standard (compression) data and special data on one recording medium, In a recording medium, standard (compression) data and special data can be made to be able to live together without confusion, and record of the standard (compression) data to this recording medium and special data and management of reproduction motion can be performed easily.

[0150]Since this defect field is specified as the defect field of a true defective part identifiable when specifying the field where special data is recorded as a defect field according to the invention according to claim 4, Also when specifying the field where special data is recorded as a defect field, this can be made to distinguish from the field of a true defective part.

[0151]When recording standard data on a recording medium

according to claim 5 and the invention according to claim 6, The management information which pinpoints the field where standard data is recorded on the management domain of a recording medium, When writing in so that this management information may be what directs a standard data record section, and recording special data other than standard data, or when a defective part is contained on a recording medium, The management information which pinpoints the field where special data is recorded on the management domain of a recording medium, The management information which pinpoints the field of the defective part on a recording medium is written in a management domain so that such management information may be what directs the defect field on a recording medium, When recording special data, add the identification information of the purport that it is special data to the above-mentioned management information, and this management information is written in a management domain, When recording the field of the defective part on a recording medium, Since the identification information of the purport that it is a true defect field is added to the above-mentioned management information and this management information is written in a management domain, When each management information recorded on the management domain makes it recognize whether it is a thing concerning [whether it is a thing about standard data, and] a defect field and has been recognized as a defect field, whether this is a thing about special data. It becomes possible to make it recognize whether it is a thing about a true defect field.

[0152]According to claim 7 and the invention according to claim 8, management information is read in the management domain of a recording medium, When the read management information is judged to be what directs the field where standard data was recorded, When the data of this field is recognized as standard data, regeneration for standard data is performed and the read management information is judged to be what directs the field where special data was recorded, When the management information which has recognized the data of this field as special data, and performed regeneration for special data, and was read is judged to be what directs a true defect field, Since it does not regenerate about the data of this field, also when standard data and special data are intermingled and recorded

in one recording medium, standard data and special data can be correctly reproduced from this recording medium.

[0153]In the record method which records information data on a recording medium according to claim 9, claim 10, and the invention according to claim 13, When recording the information data which keeps it secret, or when a defective part is contained on a recording medium, The management information which pinpoints the field where the information data which keeps it secret from the management domain of a recording medium is recorded, The management information which pinpoints the field of the defective part on a recording medium is written in a management domain so that such management information may be what directs the defect field on a recording medium, When recording the information data which keeps it secret, When adding the identification information of the purport that it is information data which keeps it secret from the above-mentioned management information, and writing this management information in a management domain and recording the field of the defective part on a recording medium, Since the identification information of the purport that it is a true defect field is added to the above-mentioned management information and this management information is written in a management domain, specific information data can be kept secret and protected.

[0154]In the regeneration method which reproduces the information data currently recorded on the recording medium according to claim 11, claim 12, and the invention according to claim 14, When it is judged that it is what directs the field where the information data which reads management information in the management domain of a recording medium, and in which the read management information does not keep it secret was recorded, When it is judged that it is what directs the field where the data which reproduces the information data of this field, and in which the read management information keeps it secret was recorded, or a true defect field, Since the data of this field is kept secret and it does not regenerate about the data of this field, specific information data can be kept secret and protected.

[Translation done.]

